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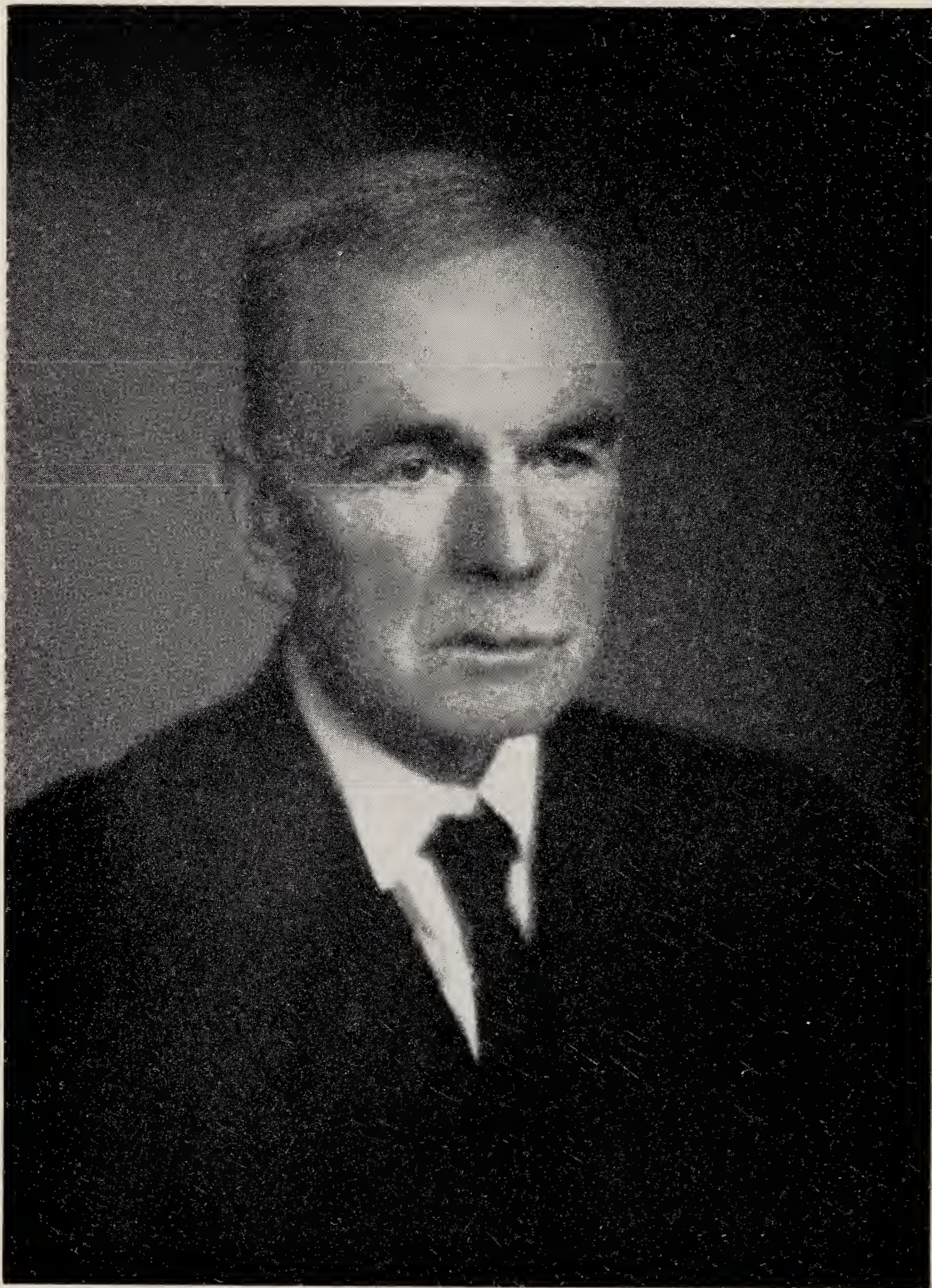
JAMES ALEXANDER MURRAY

1873—1950



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J. A. Murray.

JAMES ALEXANDER MURRAY

1873–1950

JAMES ALEXANDER MURRAY, the youngest son of William Murray, was born in 1873 at Cramond, Midlothian. He received his education at George Heriot's College and later entered the University of Edinburgh. After obtaining a B.Sc. degree in natural science he won a scholarship which enabled him to go to Germany during the summer sessions of 1895–1897 to study in the Zoological Institute of Wurzburg under Professor Theodor Boveri whose investigations on experimental cytology and chromosomes were then well known. Murray's main problem was an examination of the Nebenkern, or, as it is now called, the Golgi apparatus, in the cytoplasm of molluscan spermatocytes. He also spent some months with Professor R. Wiedersheim at Freiburg im Breisgau working on the morphology of the amphibian vertebral column. Murray's period in Germany not only gave him a lasting admiration for the thoroughness of German scientific research but endowed him with ideas which later came to fruition in his work on cancer. On returning to Edinburgh he became an assistant to Professor Cossar Ewart in the Department of Zoology. Here his attention was first directed to the problems of cancer through his association with Dr John Beard, though he never adopted Beard's theories of the origin of cancer. While teaching zoology, Murray also studied medicine and in 1899 he obtained the degree of M.B., Ch.B. The next four years were spent partly as medical officer in a mental asylum, partly as a locum tenens in a general practice in Lancashire. In 1903 Murray was asked by Dr E. F. Bashford, whom he had met in Germany, to join him in organizing the experimental investigation of malignant disease in the laboratories of the Cancer Research Fund which had been constituted in the previous year, under the aegis of the Royal College of Physicians and the Royal College of Surgeons, in two or three rooms at the top of the Examination Hall of the Royal Colleges first on the Embankment and later in Queen Square, London. Experimental cancer research had virtually been founded at the beginning of the twentieth century by the work of a Dane, C. O. Jensen, who showed that a mouse carcinoma could be transmitted to other mice by inoculating part of the tumour beneath the skin. At this time there were many pathologists who refused to admit the local origin of cancer and believed that it arose from constitutional causes. With his profound interest in the biology of the cell and his wide knowledge of zoology and comparative anatomy Murray was ideally fitted for cancer research and for the next thirty-two years cancer research was his life's work. In 1907 he obtained a gold medal for his thesis for the M.D. degree of the University of Edinburgh. In the autumn of 1914, when E. F. Bashford resigned the post of Director of the Imperial Cancer Research Fund, Murray was at first acting Director and in March 1915 was appointed Director. Ten years later in 1925 he became F.R.S. In 1927 he

delivered the Linacre Lecture at Cambridge and in 1936, the year after his retirement, he was awarded the Honorary Medal of the Royal College of Surgeons. In 1927 he married Ethel Emily Beere to whom the deepest sympathy of his many friends is extended: there were no children of the marriage. He died at Hove on 20 November 1950 from heart failure following bronchopneumonia.

Murray's working life of thirty-two years corresponds with the first phase in the scientific study of experimental cancer. His papers, published for the most part in the scientific reports of the Imperial Cancer Research Fund, as it shortly became, securely laid the foundations on which all further experimental work on cancer has been built. Although as far back as 1868 Eberth had described multiple adenomata of the skin of the frog it was commonly believed by many at the beginning of the century that cancer was confined to man and civilized man at that. The first and second Scientific Reports of the Imperial Cancer Research Fund showed clearly that cancer occurs in all races of man whatever their degree of civilization and that it can be found also in vertebrate animals, with the same essential features as in man. It is not without interest that as early as 1904 Murray and his colleagues had suggested that the so-called venereal sarcoma of the dog was due to a virus. The Second Scientific Report of the Imperial Cancer Research Fund, which appeared in 1905, dealt only with the rat sarcoma produced by Jensen by the intraperitoneal inoculation of tubercle bacilli and with a very few sporadic cases of cancer in mice. By 1909, Murray had analyzed the growth characteristics of seventy malignant new growths. It was thus possible to show without a doubt that the malignant cells produced in new hosts are the direct descendants of the injected cells whereas the stroma or supporting tissue is derived from the host. The examination of all these tumours, together with countless spontaneous tumours from animals and man, gave Murray an unrivalled knowledge of the histological characteristics of malignant growth. It is not surprising, therefore, that he subsequently became a world referee for the diagnosis of debatable tumours. Another question of great interest involved the fact that previous injections of mouse blood or tissues into mice inhibited the formation of the supporting network and thus prevented malignant cells from taking root and proliferating. The full explanation of this phenomenon is still awaited as is the transformation of the stroma of certain transplantable carcinomata into sarcomatous tissue which eventually outgrows and replaces the carcinoma. One, perhaps in retrospect the most important, contribution which Murray made in the period before the First World War was his discovery that in female mice with an immediate cancerous ancestry breast carcinoma is more than twice as frequent as in mice without such a history. Although his observations dealt with only three generations it is not without interest to recall that in a paper communicated to the Royal Society in 1911 he wrote: 'It should be possible by continued selective mating to breed two strains of mice with a still greater difference in their liability to cancer'. Such a prediction was fulfilled during his lifetime and the association of high cancer incidence with a virus-like agent transmitted in the mother's milk was demon-

strated by Bittner. In 1914 he demonstrated at the Royal Society of Medicine a cinematograph film on cell division, made by Comandon and Jolly, in France, one of the earliest attempts to enlist the cinema in the elucidation of biological problems.

During the First World War a large proportion of the staff of the Imperial Cancer Research Fund was on active service. Murray's friend, Dr F. C. Wood, Director of the George Crocker Special Research Fund in New York, offered to receive and house mice and rats bearing the more important of the transplantable tumours belonging to the Imperial Cancer Research Fund and in New York these strains were maintained and preserved till there was no longer any danger that in London they might be lost by enemy action. Murray, however, was not idle during the war years. He undertook the duties of honorary pathologist to the Zoological Society and in appreciation of his valuable work he was elected a life Fellow of that Society. In addition, he reported for the War Office on pathological specimens sent from France. During this period also he elaborated a satisfactory staining method for demonstrating bacteria in tissue sections and differentiating them from mitochondria.

Shortly before the First World War, Rous in America had reported the filterability of certain sarcomas in the fowl, and in Japan during the war years Yamagiwa and Itchikawa had shown that tar painted on the rabbit's ear would produce malignant epitheliomas. When the work of the Imperial Cancer Research Fund was resumed these lines of research were actively pursued. Murray's own papers, however, became less numerous for much of his time was taken up with administrative duties and in lectures to societies and congresses both at home and abroad. It must too be confessed that he was not entirely at ease in the world of pure chemical carcinogens and of viruses, the role of which in cancer now came in for intensive study. The lot of a director of cancer research laboratories is not entirely a happy one. He is pursued on the one hand by cranks inspired by the idea that to them alone has been divinely revealed the cause, or more frequently the cure of cancer, or by crooks who object to having their medicaments, of unrevealed composition, subjected to too severe a scientific scrutiny. Even among medical men and scientists there is often impatience that so little apparent progress is being made in elucidating the underlying causes of cancer. When, for instance, it was suggested that all forms of cancer were due to the same virus associated with a specific tissue factor, *The Times* in one of its leaders took Murray somewhat to task for his non-committal attitude. His conservatism, which has been fully justified, sprang, however, from a deep sense of responsibility.

Murray was a very lovable man with a puckish sense of humour: he was entirely without personal ambition but like most Scots he dearly loved argument and thus he was an assiduous attendant at meetings of the Pathological Society, the Pathological Section of the Royal Society of Medicine, and the Medical Research Club. He was, however, always sceptical of professional and professorial law-giving; as a result he never spared his wit on the pundits of the medical world. On one occasion at a meeting he caused some consternation

after various eminent pathologists had given confident expressions of their opinions by declaring that the specimen which he had exhibited 'for diagnosis' was a histological section of a haggis. As often as not, however, his pawky remarks were directed against himself. He was perhaps seen at his best after lunch in his laboratory where he dispensed cups of thickened Turkish coffee to all who cared to attend. This indulgence in coffee and in home-made cigarettes was, together with his weekly game of golf, his only luxury: otherwise he was completely indifferent to creature comforts. From his boyhood he had played golf and for a time he was captain of the Sandy Lodge Club. Though he did not attempt to play a long game, he usually remained on the fairway and thus eventually came home more easily than stronger but more erratic players. Before his marriage he had what was probably a unique knowledge of London's restaurants. He was allergic to onions, beloved of English cooks, and only at the few places where onions were not freely used could he eat either with safety or with pleasure.

Murray had other interests; one was the production of inexpensive laboratory gadgets from cigarette tins, pieces of string, 'plasticine', and sealing wax. Under the self-conferred designation of 'the Woolworth Scientific Company' he produced an extremely valuable microscope lamp and a reflecting analyzer for the polarizing microscope but his fireside microscope for use in an armchair unfortunately never reached the production stage. His other great interest was the Royal Microscopical Society where he could foregather with professional and amateur microscopists and talk 'pond-life' to his heart's content. He was originally proposed for the fellowship of this society by his friend J. E. Barnard whose obituary was his last publication. He served the Society faithfully as secretary from 1921-1925, and as vice-president from 1928-1929, 1936-1937 and again from 1947-1948. He was twice president from 1926-1927 and again in 1946. In 1949 at the last scientific meeting which he ever attended he received the honorary fellowship of the Society, a number of his former colleagues read papers on cancer research, and in the evening he and Mrs Murray were entertained to dinner. The scientific papers read on that occasion were subsequently published in June 1950 in a special 'Murray Number' of the *Journal of the Royal Microscopical Society*. As an instance of the influence which he exerted it is not without interest that two former members of his staff have since occupied the presidential chair of the Royal Microscopical Society.

To all his subordinates Murray was kindly and generous to a fault; one of his last sayings was that he had tried to give all his colleagues freedom. He maintained the highest standards of integrity in both private and professional life and only to those who knew him really well did he reveal the stern control which he exercised over himself and his emotions. His influence on cytology and on cancer research will remain for, despite all the alarms and excursions, it is once again recognized that, as he once wrote, 'the fundamental problems of cancer research involve the elucidation of processes which take place inside the parenchyma cells of malignant tumours'.

G. M. FINDLAY

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